Abies Delavayi in Cultivation.

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With Plates CLXII-CLXIV.

FROM recent correspondence addressed to the Royal Botanic Garden it became evident that doubts existed as to what the true *Abies Delavayi* is, as to whether the true plant is in cultivation, and if not, as to the identification of plants recently introduced under that name. The plants at present under cultivation come from two districts in China, viz. Western Szechuan, where seeds were collected by E. H. Wilson; and Western Yunnan, where G. Forrest collected seeds. For some time now it has been recognised that the pioneers were mistaken in their ideas that the Himalayan and S.W. Chinese floras were practically identical. Wherever possible plants of the earlier collections were referred to Himalayan species. But more recent critical work has shown us that in the S.W. corner of China we must recognise certain definite floristic areas. Two such regions which must be regarded as distinct are W. Szechuan, the exploration of which has been so well carried out by E. H. Wilson, and that portion of Yunnan which concerns us at present where Delavay obtained the material elaborated by Franchet and from which no small part of the rich collections of G. Forrest has been obtained. Occasion therefore arises for a careful examination of the material when one finds Wilsonian plants enumerated as identical with Delavayan. Examination of Wilson's material of his so-called *Abies Delavayi* has afforded additional proof of the distinctness of the two regions referred to. Wilson's Szechuan plant is, in my opinion, certainly not identical with Franchet's Yunnan *A. Delavayi*. For the Szechuan material seen by me I propose the new combination *A. Faberi*, since the plant had already been described as *Keteleeria Fabri* by Masters.

Further confusion arose owing to the fact that a Forrestian plant has been distributed and is growing here as in other places

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under the name *A. Delavayi*. Now *A. Delavayi* was based on a Tali plant collected by Delavay, and, as noted below, Forrest's Tali plant is identical with *A. Delavayi*. But the Forrestian plant in cultivation was raised not from Tali but from Lichiang seed, and the Lichiang plant proves quite distinct from the Tali one. For this Lichiang plant I propose the name *A. Forrestii*.

The following is a limited account of the synonymy and distribution of the species concerned, with diagnosis of the new species. I have limited the synonymy because from what has been said above it will be readily understood that, so far as our present knowledge goes, any reference to *A. Delavayi* based on a Szechuan plant is probably to *A. Faberi*, but certainly not to the true *A. Delavayi*.

SYNONYMY AND DISTRIBUTION WITH DESCRIPTION OF NEW SPECIES.

A. Delavayi, Franchet in Journ. de Bot., xiii, p. 255 (1899) ; auct. alii tantum quoad pl. Delavayanam et Forrestianam.

Yunnan. Tsang-chan, supra Tali, 3500–4000 m., R. P. Delavay, 1210. Open situations at the base of cliffs in side valleys on the eastern flank of the Tali Range, 8000–10,000 ft. Lat. 25° 40′ N. Shrub or tree of 10–40 ft. G. Forrest, 4606 !

A. Faberi, Craib, comb. nov.

A. Delavayi, Masters in Journ. Linn. Soc., xxxvii, 422 (1906) ; Patschke in Engler, Bot. Jahrb., xlviii, 642 et seq (1913), pro parte ; Rehder et Wilson in Pl. Wils., pt. iv, p. 41 (1914), saltem pro parte, *vix* Franchet.

Keteleeria Fabri, Masters in Journ. Linn. Soc., xxvi, 555 (1902) ; id. in Gard. Chron., xxxiii, 194 (1903) ; Mottet in Rev. Hort., 1904, pp. 130–1 ; Masters in Journ. Linn. Soc., xxxvii, 421 (1906) ; Patschke in Engler, Bot. Jahrb., xlviii, 649 (1913).

Pinus Fabri, Voss in Putlitz et Meyer Landlexikon, iv, 773 (1913)—ex Rehder et Wilson, l.c.

Western Szechuan. Mount Omei, Faber, 984 (Herb. Kew !) ; Wa-shan, 3000–3600 m., Wilson, 2089, July 1908 (Herb. Edin. !).

I am indebted to the Director of the Royal Gardens, Kew, for the opportunity of examining Masters' type plant of *Keteleeria Fabri*.

The Szechuan and Yunnan plants, though unquestionably very closely allied, are, I believe, specifically quite distinct. My conclusions are based on a Tali plant collected by G. Forrest, and this plant conforms exactly to Franchet's original descrip-

tion of *A. Delavayi* which was drawn up from Delavay's Tali plant.

One of the main points noted by Franchet is that the transverse section of the leaf approximates in outline the symbol ∞. Forrest's plant fits exactly in this respect. The margins are so completely recurved that they practically touch the very prominent midrib, and throughout its length the lower surface is completely concealed. Further, this condition is maintained absolutely in Forrest's plant up to and including the oldest leaves, which in the herbarium specimens are 4 years old. Now in Faber's and Wilson's plant strong recurving of the margins are present, but the lower surface is not completely concealed throughout its length, and, moreover, here as the leaves become older the recurving becomes less pronounced, so that the lower surface becomes completely or almost completely uncovered.

Again, in Forrest's plant the lateral leaves tend to curve outwards in the lower part, but from about the middle or from just below the middle they curve inwards, whereas in Wilson's plant when the leaves are curved the curvature is uniformly backwards. The incurving of the leaves is mentioned by Franchet in his original description of *A. Delavayi*.

Transverse sections of the leaf of the two species, while showing no absolute differentiating mark, yet afford useful comparative differences which from the available material appear to be constant. Both species show a well-developed hypodermis, but that of *A. Delavayi* as also the epidermis consists of conspicuously thick-walled cells. Below the divided fibro-vascular bundle we find in *A. Delavayi* a few sclerotic cells, whereas in *A. Faberi* sclerenchyma is not prominently developed and is not constant. In *A. Faberi* the leaf margin is more or less conspicuously acuminate; in *A. Delavayi* the leaf margin is not acuminate or very shortly and very bluntly so. In *A. Delavayi* the large resin canals are more prominent, and the cells of the lower epidermis are more papillose on the midrib and towards the leaf margins than in *A. Faberi*.

Abies Forrestii, Craib, sp. nov.

Arbor 30–60-pedalis; ramuli vivi iuventute primo transverse corrugatuli, dein plus minusve papillosi, brunnei, glabri vel magis minusve pilulosi, mox parum pallidiores, longitudinaliter et saepe transverse fissi; cicatrices circulares; alabastra terminalia obovoidea, pallida, valde resinosa; perulae ad annos 5 saltem persistentes, ramulorum bases cingentes. Folia spiraliter inserta, pectinatim disposita, adscendentia, in plantis vivis paginam inferiorem bene exhibentia, saepissime parum longitudinaliter arcuatim retroflexa, inferiora superioribus longiora,

ad 4 cm. longa et 2.5 mm. lata, supra nitido-viridia, subtus fasciebus duobus stomatiferis utroque e lineis circa 12 constituto albis praedita, apice rotundata, emarginata, nervo mediano supra impresso subtus valde prominente. Amenta mascula apicem versus ramulorum aggregata, sessilia, 12–15 mm. longa, folia subaequantia.

Cult. Hort. Bot. Reg. Edin., G. Forrest, 6744 !

Yunnan. Eastern flank of the Lichiang Range. Lat. 27° 25′ N. 10,000–11,000 ft. Tree of 30–60 ft., forming forests. G. Forrest, 6744 (Herb. Edin. !).

This species, whose introduction to cultivation we owe to Mr. G. Forrest, is one of the prettiest foliaged plants of the genus. The very white undersurface of the leaves is conspicuous at some distance from the plant owing to the course of the leaves, those inserted on the lower side of the branchlet being directed forwards and upwards at the base and curving slightly backwards from about the middle, those on the upper side are twisted at the apex of the petiole to the sides, and also curve slightly backwards. The V-shaped groove is conspicuous but narrow. The terminal buds, as also the lateral, are short, rounded at the apex, pale pinkish-white, and heavily resin-coated. Branchlets in the first year are brown, glabrous, or with scattered erect short stiff hairs ; in the second year they are dark-brown.

Transverse sections of the leaf show a well-developed continuous hypodermis on the upper surface and on the lower side at the prominent midrib a 2- or in part 3-seriate hypodermis, 2 lateral, sub-epidermal, medium-sized resin canals, a definite endodermis enclosing a divided fibro-vascular bundle, a group of sclerotic cells on the lower side of the bundle, and usually 1–3 such cells above. The leaf-margins are slightly recurved.

Conclusions

I. *Abies Delavayi*, Franchet, is not in cultivation.

II. The plant introduced as *A. Delavayi* from Szechuan should be known as *A. Faberi* (Masters), Craib.

III. The Yunnan plant introduced by Mr. G. Forrest has been described as a new species—*A. Forrestii*, Craib.

LIST OF PLATES,

Illustrating Mr. Craib's Paper on Abies Delavayi.

PLATE CLXII. Photograph of *A. Forrestii* growing in the Royal Botanic Garden, Edinburgh.

CLXIII. Photograph of herbarium specimen of *A. Delavayi*, Franchet.

CLXIV. Photograph of herbarium specimen of *A. Faberi* (Masters), Craib.